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YUKON GEOLOGICAL SURVEY

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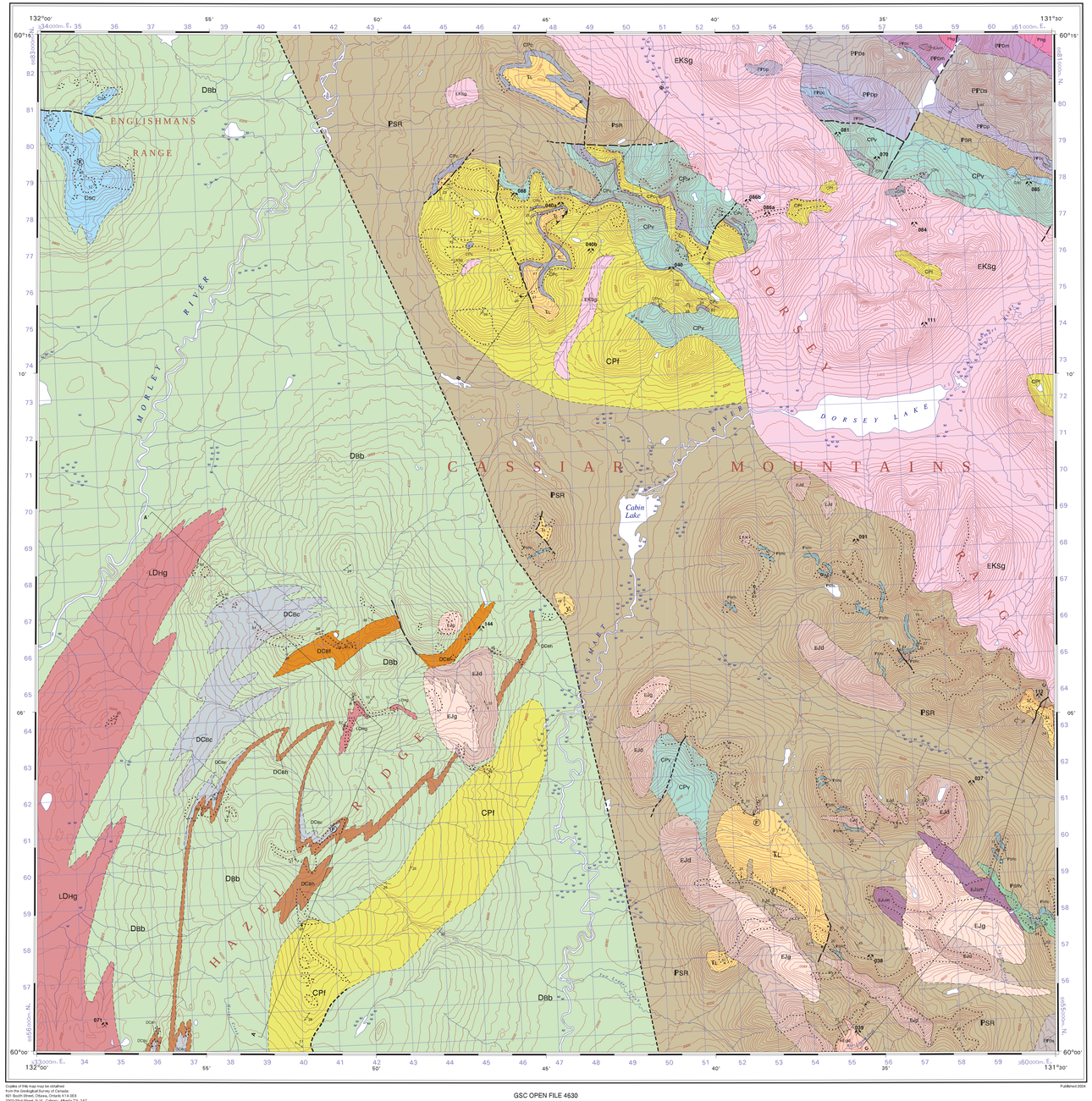

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Digital cartography by P. Dhesi, Geological Survey of Canada, Pacific Division

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

LOCATION MAP

GSC OPEN FILE 4630
YGS OPEN FILE 2004-2
BEDROCK GEOLOGY

DORSEY LAKE

YUKON TERRITORY

Scale 1:50 000/Échelle 1/50 000

kilomètres 1 0 1 2 3 4 kilomètres

Universal Transverse Mercator Projection
North American Datum 1983

Projection transverse universelle de Mercator
Système de référence géodésique nord-américain, 1983

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Digital base map from data compiled by Geomatics Canada, modified by the Geoscience Information Division

Universal Transverse Mercator Grid Zone 9

Mean magnetic declination 2003, 25°20'E, decreasing 17.7' annually.

Elevations in feet above mean sea level
Contour interval 100 feet

105 G/7	105 B/5 OF 4631 YGS OF 2004-3	105 B/6
105 G/1	105 B/4 OF 4630 YGS OF 2004-2	105 B/3 OF 4632 YGS OF 2004-1
104 N/16 BCGS OF 2001-4	104-O/13 BCGS OF 2000-8	104-O/14 BCGS OF 2001-6

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE

Titles and authors of those adjoining maps are listed in References

Published 2004

OVERLAP ASSEMBLAGES

LAYERED ROCKS

LOWER TO MIDDLE TRIASSIC

TL — *Black slate and phyllonite; limy metasandstone and pebble conglomerate; minor dark grey limestone*

PERMIAN OR OLDER
KLINKIT GROUP

CPf — *Upper clastic member: Brown-weathering indurated metasiltstone and sandstone, interbedded chloritic meta-tuff, quartzose grit and light grey marble*

CPc — *Beige-weathering marble, locally silicified; rare chloritic interbeds*

CPv — *Volcanic fragmental member: Undifferentiated meta-tuff and volcanic breccia of intermediate composition; minor chloritic meta-sandstone and meta-siltstone "dust-tuffs"*

MIDDLE MISSISSIPPIAN TO LOWER PENNSYLVANIAN

CSc — *Screw Creek Limestone: Thin- to thick-bedded light grey weathering commonly bioclastic limestone and dolomitic marble; minor maroon and green phyllite and green bedded chert.*

YUKON-TANANA TERRANE

LOWER CARBONIFEROUS AND OLDER
BIG SALMON COMPLEX

DCbt — *Cabin Lake unit: fine-layered, plagioclase-phyric meta-tuff (intermediate composition) with bands of quartz-rich phyllite and meta-grit; minor carbonate*

LDHg — *Hazel Pluton: granitoid gneiss, alaskite to meta-diorite (U-Pb zircon ages: 336 ± 4 and 362 ± 3 *Ma; Mihalynuk et al., 1998, 2000*)*

DCBc — *Buff-weathering limestone and marble*

DCBh — *Mount Hazel Metachert: Laminated quartzite, locally rich in pink pelidmonite and hematite (Crinkle chert of Mihalynuk et al., 1998; 2000)*

Dbb — *Smart River Greenstone: Chloritic metabasalt and meta-tuff of intermediate to mafic composition; minor volcanic meta-sandstone*

fault, section of motion unclear

PERMIAN

PRg — *Ram Stock: Coarse-grained monzonite, granodiorite (U-Pb zircon 258 ± 2 Ma; J.K. Mortensen, pers. comm., 2003) (intrudes Dorsey Complex)*

LOWER CARBONIFEROUS AND OLDER
SWIFT RIVER GROUP

PSR — *Dark-coloured quartz-plagioclase grit, meta-sandstone; minor phyllite, argillite, quartzite, conglomerate, limestone and chloritic meta-tuff (U-Pb detrital zircons as young as 422 Ma; Gleeson et al., 2001), carbonaceous siltstone, grey chert and volcanic breccia (intermediate composition)*

PSRc — *Light grey to beige limestone and marble lenses, not stratigraphic*

PSRv — *Chloritic andesitic intrusions, breccia and tuff; green siliceous argillite*

CARBONIFEROUS AND OLDER
DORSEY COMPLEX

PPDp — *Upper Dorsey unit: Red-brown weathering phyllite, grey pelite and quartzite, grey metachert and quartz-sericite schist (U-Pb zircon: 355.6 ± 2.7 Ma Roots and Heaman, 2001.); highly foliated meta-plutonic rocks*

Big Salmon Complex (Mulligan, 1963) consists of foliated plutonic and siliciastic rocks, and includes late Devonian(?) to mid-Mississippian stratigraphy described in adjacent BC (Mihalynuk et al., 1998; 2000). REE concentrations in metavolcanic flows (Smart River greenstone) reveal an arc composition (Mihalynuk et al., in prep.). Isolated outcrops in the valley east of Morley River reveal the northern extent of the Hazel meta-pluton, a foliated tonalite-alaskite body (*Hazel Intrusions*; Mihalynuk et al., 1998). Disparate U-Pb zircon dates suggest multiple intrusive phases (M.Mihalynuk, pers. comm., 2002).

The Mount Hazel meta-chert has elevated Mn and Ba, suggesting a hydrothermal origin (Mihalynuk et al, 1998). It and the flanking marble have been traced in broad west-verging recumbent folds across the map area to the south (Mihalynuk et al., 2001a). A rugose coral fragment was collected from the mid-section of Hazel Ridge (Poulton et al., 1999) and the same unit contains crinoid ossicles south of the map area (Alaska Highway at Logjam Creek) but neither provides definitive age information. The Cabin Lake unit may be equivalent to the ca. 325 Ma Mount Francis metadacite (18 km southeast of the map area; Mihalynuk et al., 2000) but did not yield datable zircons.

Dorsey Complex and Swift River Group: The northeast corner of the map area is underlain by mafic schist and gneiss, phyllite and boudinaged marble of the Dorsey Complex. Its mineral assemblages reflect a medium-to high pressure and temperature episode (Stevens, 1996) prior to intrusion by the Permian Ram stock. Swift River Group

PPDs — *Biotite ± garnet schist, metagrit, minor marble*

PPDm — *Lower Dorsey unit: Hornblende schist and gneiss, locally contains felsic leucosome (U-Pb zircon date: 373 ± 14 Ma Roots and al., 2003); amphibolite*

SYN- AND POST-OROGENIC INTRUSIVE ROCKS

PALEOCENE

EKgd — *Logtung stock: Hornblende granodiorite, monzogranite (U-Pb zircon - 58.6 ± 1.5 Ma Mihalynuk and Heaman, 2003)*

EARLY CRETACEOUS

EKg — *Biotite granite, granodiorite, leuco-quartz monzonite, alaskite*

EKSg — *Seagull Batholith*

EARLY JURASSIC

EJg — *Non-foliated, K-feldspar porphyritic granodiorite, monzonite; minor diorite, gabbro "dust-tuffs"*

EJd — *Hornblende diorite and quartz diorite; minor biotite hornblende quartz monzonite*

EJum — *Ultramafite: Gabbro, serpentinite and dunite*

SYMBOLS

Bedding: inclined, upright, overturned

Dominant foliation (transposition foliation; commonly parallel to compositional layering): inclined, vertical, (2nd stage) inclined, (2nd stage) vertical

Igneous layering

Compositional layering

Crenulation lineation

Elongation or mineral lineation

Intersection lineation, with vergence: M fold

Folds, with vergence: M fold

Cleavage

Jointing

U/Pb zircon date, age in Ma — 258 (U)

Fossil locality — (F)

Geological contact: defined, approximate, assumed

Limit of outcrop

Normal fault: defined, approximate, inferred
solid circle on downthrown side

Thrust fault: defined, approximate, inferred
teeth on upthrust side

Upright folds: antiform, synform

Overturned folds: antiform, synform

Cross-section line — A A'

Yukon MINFILE (1058) occurrence — 113

NOTES

Consists of metamorphosed grit, decimeter-bedded siltstone-sandstone couplets with rare carbonate and intermediate metavolcanic layers. It contrasts with the black chert-quartzite succession exposed east of the map area. At least locally it appears to overlie Dorsey Complex (Roots et al., 2003).

Overlap Assemblages

The Klinkit Group (Simard et al, 2003) is a carbonate-volcaniclastic succession. Hill-capping limestone northwest of Morley River contains abundant coral, brachiopod and crinoid fragments typical of Screw Creek Limestone whose type area is immediately east of the map area. The meta-greywacke unit at the south end of Hazel Ridge (Upper Dorsey Complex; Roots et al., 1998) unconformably overlies the Smart River Greenstone and is here correlated with the Klinkit Group.

Andesitic meta-tuff, breccia and volcanic-derived siltstone and sandstone on ridges northeast of Dorsey Lake include a light grey to pink-weathering marble 35 m thick as a useful stratigraphic marker. The cross-section depicts recumbent folds but does not portray the pervasive layer-parallel deformation. In the same area underlying crenulated rusty schist and lectonite exposed at the base of north-facing cirques is here correlated with Swift River Group but may be part of Dorsey Complex.

The black argillite capping these hills is considered Triassic, based upon its similarity that unit north of Logtung and in northern BC (Roots et al., 2002).

Unfoliated plutonic rocks

A series of Early Jurassic (and possibly older) intrusions trend northwest from northern BC (Simpson Peak and Nome Lake batholiths; Gabrielse, 1969; Mihalynuk et al., 1998) to the Teslin River (Stevens et al. 1993; Gordey et al., 1998). In Dorsey Lake map area the oldest representative is a composite olivine dinopyroxenite, dunite and serpentinite body at the head of Logjam Creek. Of intermediate age are massive hornblende diorite plutons, intruded locally by tonalite and granodiorite. Hornblende K-feldspar "porphyry" dikes and sills of Logtung age are interpreted to have split the ultramafic body (Poole, 1956; Abbott, 1981). The southern lobe contains a coarse-textyrite phase.

The Cretaceous Seagull batholith has a coarse-grained, seriate-textured core and a fine-grained margin that is predominant at the northwest end. This pluton is rich in rubidium (Lverton and Botelho, 2001), boron and fluorine and is approximately 101 Ma (Mato et al., 1983; Wanless, 1972; Mortensen, 1999).

Felsic porphyritic mono-granite at the head of West Logjam Creek is 118 ± 2 Ma by Rb-Sr (Stewart, 1983; Stewart and Evensen, 1983) but includes granite that is Early Tertiary (58.6 Ma by zircon with hydrothermal characteristics; Mihalynuk and Heaman, 2002).

MINERAL OCCURRENCES

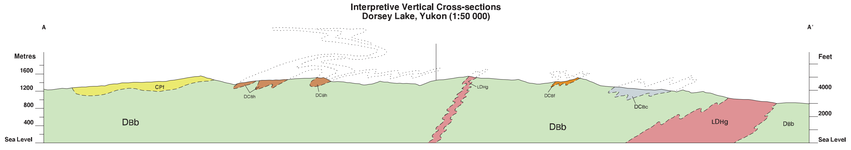
The map area contains many skarn and vein occurrences. The principal occurrences are Logtung, Logjam, JC. These and surrounding sites were intensely explored between 1978 and 1983.

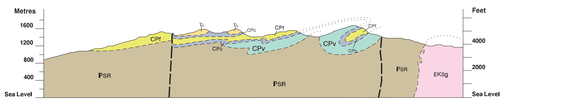
Mineralization at JC was interpreted as magmatic by Layne and Spooner (1991) and the nearby Smith occurrence reported as skarn. The lead lead isotopes of some samples from these were non-radiogenic, suggesting sedimentary origin (Mortensen and Gabites, 2002).

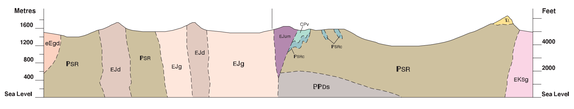
Tourmaline orbicules and scheelite gneisen are present wherever carbonate is within 100 m of the contact with Seagull granite. The Logtung W-Mo porphyry deposit (Christopher, 1978) lies within a vertical granitic dyke whose blond sericitic alteration envelope was dated at 109 ± 2 Ma by K-Ar (Hunt and Roddick, 1987, p. 189). Minor scheelite in discontinuous skarn flanks the granitic stock (Noble et al., 1983; 1984).

A pyrite-chalcopyrite showing in siliceous sericite schist, 4.5 km southwest of Cabin Lake Minfile occurrence #144 and its Devonian-Mississippian model age (Mortensen and Gabites, 2002), points toward a volcanogenic origin. Manganiferous metachert is exposed in the nearby creek (W. Jakubowski, pers. comm., 2000) and extracted as ornamental stone near the Alaska Highway south of the map area (R. Hibbing, pers. comm., 2003).

Interpretive Vertical Cross-sections
Dorsey Lake, Yukon (1:50 000)







Mineral Occurrences 105B/4
Yukon MINFILE (Dekleva, 2003)

No.	Name	Minerals, type
105B 037	Smart	work target
105B 038	Logjam	Au, Ag vlens
105B 039	Logtung	W, Mo-porphyry
105B 040	JC	Sn skarn
105B 070	Can	Sn skarn
105B 071	Television	
105B 081	Duval	Sn skarn
105B 084	DU	Sn vein
105B 085	Tin	Sn skarn
105B 086	Cusp	Sn vein
105B 088	Smith	Sn, unknown
105B 091	Klinkit	unknown
105B 111	Dorsey	unknown
105B 112	Hollister	W skarn
105B 144	Cabin Lake	Cu-Zn stratiform

Note: sub-occurrences a,b etc are showings linked to main occurrence by the original finder

Ancient Pacific Margin
NATMAP CARTNAT
Ancienne marge du Pacifique

Yukon
Energy, Mines and Resources

Yukon Geological Survey
Energy, Mines and Resources
Yukon Government

Open File 2004-2

Bedrock geology, Dorsey Lake (NTS 105B/4)
Yukon Territory
(1:50,000 scale)

by

C. Roots, J. Nelson, M. Mihalynuk, T. Harms, M. de Keijzer and R-L. Simard

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